

# Low Flammability Polymer Blends

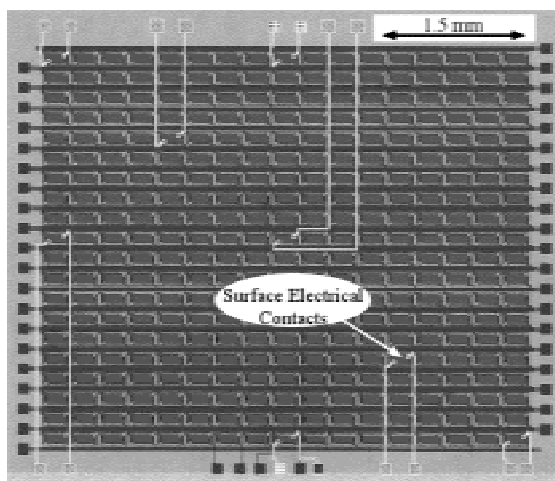
- Critical Issues

- In response to the needs of industry for more efficient research and development tools, we have initiated a research program directed at the development of high-throughput methods for the formulation and flammability screening of multi-component polymer blends and polymer/clay nanocomposites.

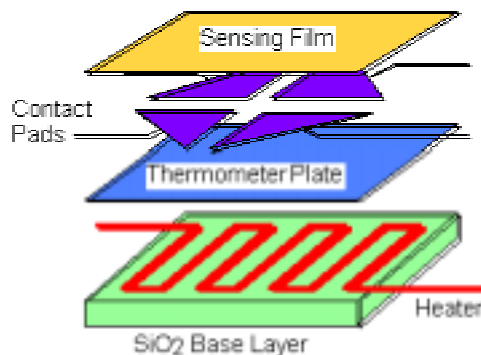
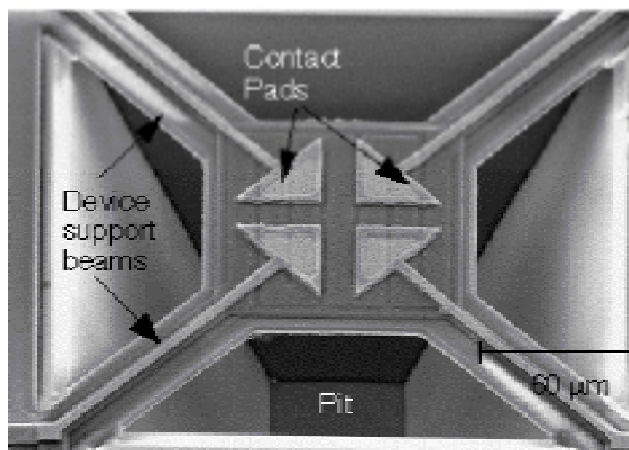
- Research Strategy

- Our first challenge is to adapt the existing technology for parallel synthesis, originally designed for discovery applications in the pharmaceutical industry, to provide the capability to create sample libraries consisting of varying amounts of polymer, clay, solvents, compatibilizers, and other additives. Commercial reactors, equipped with mixers, heaters and filtration capabilities that allow for independent control of the reaction conditions in each vessel, will be exploited in the process of removing solvents and enhancing the mixing between components. Samples of these solvent blended nanocomposites will be extracted and deposited on microhotplate arrays using piezoelectric micro-inkjet technology, electrospray deposition, or flow coating techniques, depending on their size and rheological properties. The material on each element will be heated at a specified rate representative of fire conditions. Flammability performance will be assessed on the basis of correlations between the thermal mass of the sample, as indicated by the power required to maintain the specified heating rate, and the rate of mass loss from representative materials measured by conventional flammability test methods.

340 Element Microhotplate Array



Exploded View of a Microhotplate Element



For more information ...

Marc Nyden and Jeffrey Gilman, Fire Research Division